

Robotic Emergency Surgery in Geriatric Care

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Background

- The US population ≥ 65 years increased by **34%** from 2012–2023
- ~20% of ED visits involve adults > 65 years old
- Emergency general surgery (EGS) carries:
 - 5 $\times$ higher mortality
 - 3 $\times$ higher complication rates
- Minimally invasive surgery (MIS) improves outcomes in elective settings, but its role in **older adult EGS** remains unclear.

Hypothesis

Robotic surgery has noninferior outcomes compared to laparoscopy in geriatric emergency general surgery patients.

Methods

NSQIP Inquiry 2022-2023

Urgent Surgery
Emergent Surgery

Inclusion:

Age > 65 years
CPT Codes 43500 - 50000

Statistics

- Multivariable regression
- Propensity score matching (robotic vs lap)

Robotic Intervention

1,832
Patients

Laparoscopic Intervention

30,137
Patients

Open Intervention

26,971
Patients

Primary Outcome

- Severe complications (composite: reoperation, intubation, AKI, MI, arrest, transfusion, sepsis)

Secondary Outcomes

- LOS, Discharge disposition, Readmission, Mortality

Results

Pre-Operative Characteristic	Robotic (n=742)	Laparoscopic (n=742)	p-value
Age	80.23	80.23	0.974
Sex			1.00
• Male	48.4%	48.4%	
• Female	51.6%	51.6%	
Race			0.678
• White	83.0%	83.0%	
• Black	9.0%	8.1%	
• Other Races	8.0%	8.9%	
HTN	75.3%	78.2%	0.197
CHF	11.2%	12.4%	0.469
Renal Failure	1.3%	1.3%	1.00
Dementia	8.5%	6.9%	0.242
COPD	8.6%	8.0%	0.638
Functional Status			0.299
• Independent	89.2%	90.8%	
Bleeding Disorder	12.7%	13.5%	0.644
Smoker	5.3%	5.3%	1.00
Estimated Probability of Mortality	1.4%	1.4%	0.93
Case Acuity			0.583
• Urgent	65.6%	67.0%	
• Emergent	34.4%	33.0%	
Sepsis	2.6%	6.5%	<0.001

Table 1: Patient pre-operative characteristics after propensity matching

Operative Characteristic	Robotic (n=742)	Laparoscopic (n=742)	p-value
Operative Time (min)	82.5	110	<0.001
Conversion to Open	6.6%	13.3%	<0.001
Length of Stay	5 days (2-8 days)	5 days (3-10 days)	0.024
Discharge Home	79.1%	83.6%	0.027
Mortality	3.4%	4.7%	0.232

Table 2: Operative characteristics and post-operative findings after propensity matching

Post Operative Complications

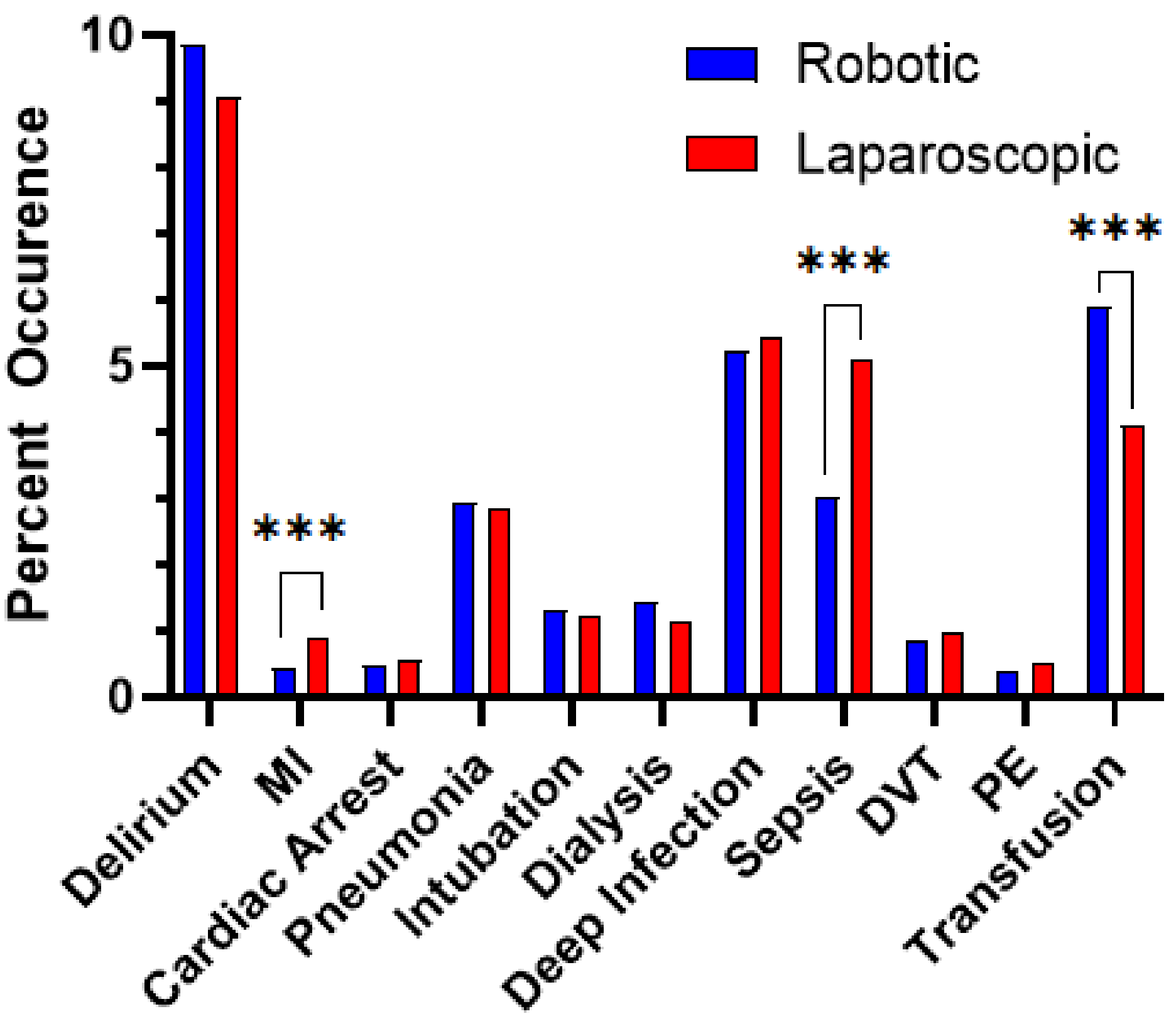


Figure 1: Occurrence of post-operative complications for robotic and laparoscopic interventions

Severe Outcomes

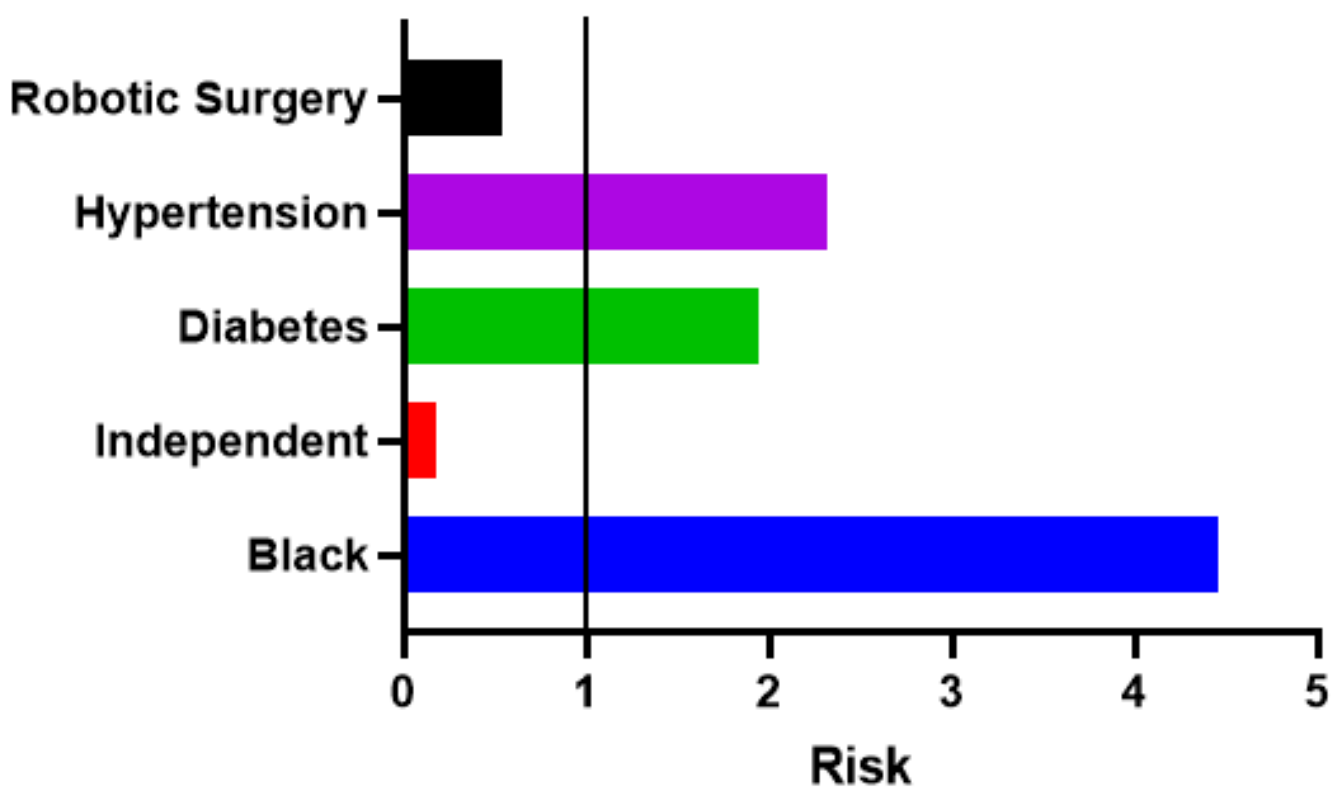


Figure 2: Relative risk of severe outcomes

Discharge Home

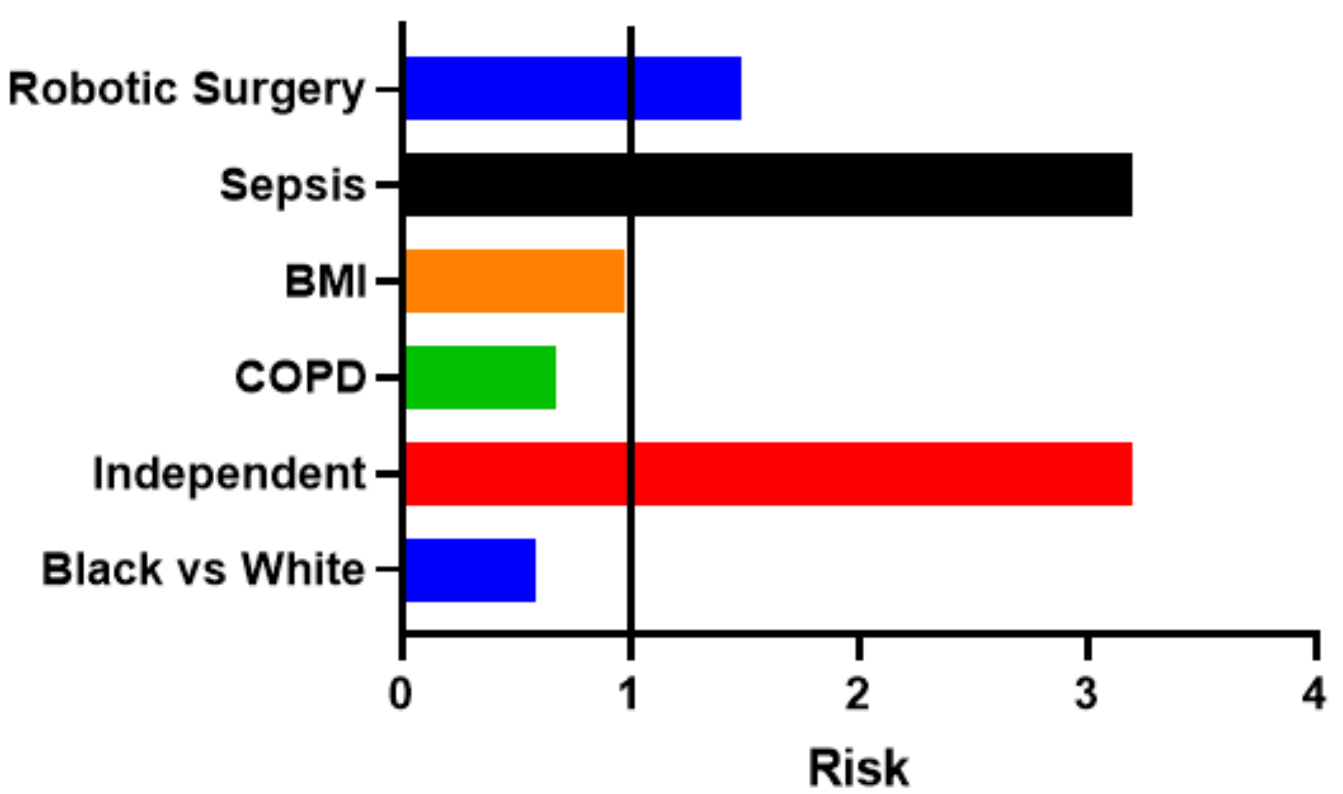


Figure 3: Relative risk of discharge home

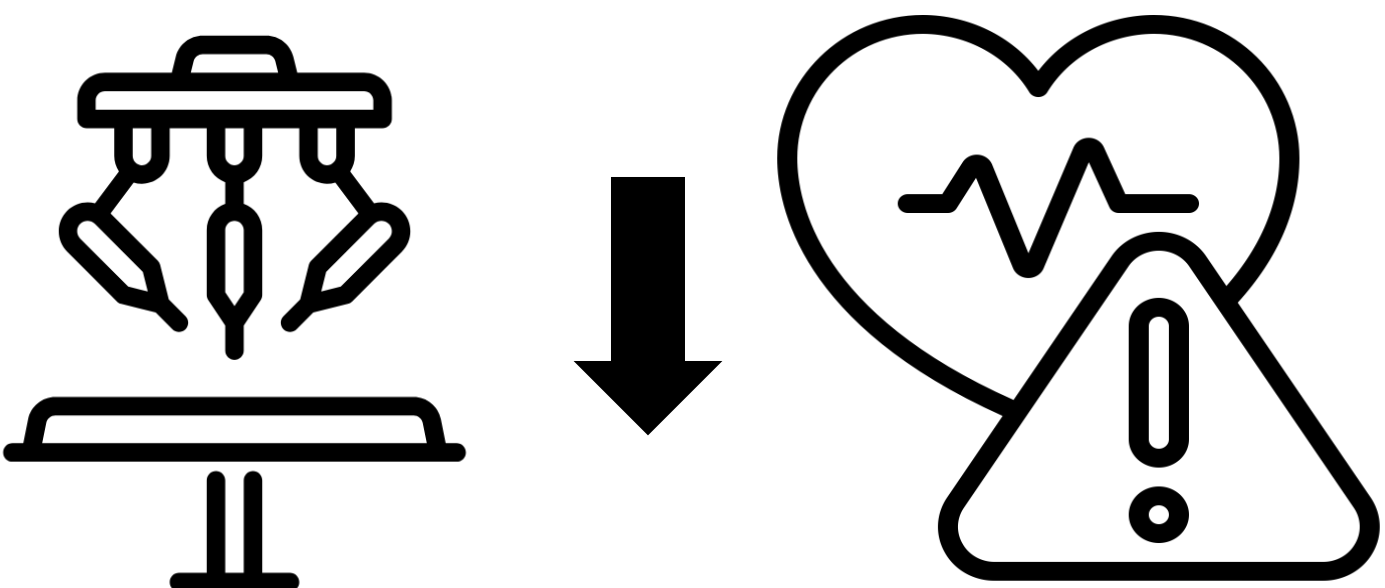
Discussion

Key Findings

- Robotic surgery demonstrated:
 - Shorter** operative times
 - Decreased conversion** to open
 - Shorter** length of stay
 - Lower** post-operative cardiac **complications**
 - Lower** rate of post-operative **sepsis**
 - Higher rates of post-operative transfusion

Robotic surgery was associated with a **decreased** rate of severe **complications** and a higher rate of discharge home

Conclusions



Robotic intervention is associated with decreased severe complications in geriatric patients

- Age alone should not preclude robotic EGS
- Frailty and physiologic reserve remain critical determinants
- Robotic platforms may provide technical advantages in complex geriatric patients

References and Correspondence

